

as well its sides and bottom, and to form the horizontal traces and diamonds **68**. The vertical carbon ink traces or wires **104** are shown overlaying the floating diamonds **68** and horizontal conductors **69**.

Solder mask insulation **103** is provided to separate the carbon ink traces from the horizontal copper traces **69** while allowing contact between the carbon ink traces and the diamonds **68**, as shown in FIG. **8B**. As is conventional, a mylar layer is provided over the top of the two-layer touchpad **100**, but which is omitted from FIGS. **8A** and **8B**. Via **66**, described above, is also shown in FIG. **8B**.

FIG. **9** is a view of the actual underside **110** of a two-layer touchpad showing components attached thereto in the well known manner by soldering. Such components include the sensing circuitry, controller, interconnect wiring, or whatever conventional circuitry is associated with touchpad **10**.

By suitable use of screen-printed carbon ink patterning, combined with patterning of the solder-mask layer on the top (finger) surface, a compact capacitive touchpad pointing device has been constructed using only a two-layer printed circuit board as a substrate with one layer on one side of the board defining both the horizontal and vertical traces and a second layer on the underside of the printed circuit board, formed in the conventional manner, by the controller chip and/or related touchpad circuitry.

Although the present invention has been shown and described with respect to preferred embodiments, various changes and modifications are deemed to lie within the spirit and scope of the invention as claimed. The corresponding structures, materials, acts, and equivalents of all means or step plus function elements in the claims which follow are intended to include any structure, material, or acts for performing the functions in combination with other claimed elements as specifically claimed.

What is claimed is:

1. A touchpad pointing device comprising:
  - a printed circuit board having a top and under side,
  - a first layer on the top side of the printed circuit board which includes a plurality of metal sense pads,
  - and a first plurality of conductive traces disposed in a first direction connecting some of said sense pads forming sensor electrodes in said first direction,
  - and a second plurality of conductive traces disposed in a substantially orthogonal direction connecting others of said sense pads forming sensor electrodes in said second direction said first and second plurality of conductive traces are on the same surface of the first layer,
  - and a second layer formed on the underside of the printed circuit board which includes conductors for the interconnection of electrical components associated with the touchpad.
2. The sensor of claim 1 wherein said first plurality of conductive traces is metal and where said second plurality of conductive traces is conductive ink.
3. A touchpad as in claim 2 where an insulator is provided at each intersection of a metal trace and conductive ink trace.
4. A touchpad as in claim 3 wherein said first plurality of metal traces is copper and wherein said plurality of conductive ink traces is carbon ink.
5. A touchpad as in claim 3 wherein the insulator is solder mask insulator.
6. A touchpad as in claim 3 where the sense pads are in the shape of diamonds.
7. A touchpad as in claim 3 including an additional protective layer of Mylar over the first layer.

8. A touchpad as in claim 2 wherein said first plurality of metal traces is formed in copper and wherein said second plurality of conductive ink traces is carbon ink.

9. A touchpad as in claim 2 where the sense pads are in the shape of diamonds.

10. A touchpad as in claim 2 including an additional protective layer of Mylar over the first layer.

11. A method of fabricating two-layer touchpad for use in a system for moving a cursor on a display screen comprising,

forming a first layer on the top side of the printed circuit board which includes a plurality of metal sense pads, and a first plurality of conductive traces disposed in a first direction connecting some of said sense pads forming sensory electrodes in said first direction,

and a second plurality of conductive traces disposed in a substantially orthogonal direction connecting others of said sense pads forming sensor electrodes in said second direction; said first and second plurality of conductive traces are on the same surface of the first layer,

and forming a second layer formed on the underside of the printed circuit board which includes conductors for the interconnection of electrical components associated with the touchpad.

12. A method as in claim 11 wherein the step of forming said first plurality of conductive traces in metal is accomplished using conventional printed circuit board fabrication techniques and wherein the step of forming said second plurality of conductive traces is done as conductive ink traces.

13. A method as in claim 12 including the step of forming an insulator at each intersection of a metal trace and conductive ink trace.

14. A method as in claim 13 wherein the step of forming the first plurality of metal traces comprises forming them of copper and the step of forming said second plurality of conductive ink traces comprises forming them of carbon ink.

15. A method as in claim 13 wherein the step of forming an insulator comprises the step of forming a solder mask insulator.

16. A method as in claim 13 wherein the step of forming the sense pads comprises the step of forming them in the shape of diamonds.

17. A method as in claim 13 including the additional step of forming a protective layer of Mylar over the first layer.

18. A method as in claim 12 wherein the step of forming the first plurality of metal traces comprises forming them of copper and the step of forming said second plurality of conductive ink traces comprises forming them of carbon ink.

19. A method as in claim 12 wherein the step of forming the sense pads comprises the step of forming them in the shape of diamonds.

20. A method as in claim 12 including the additional step of forming a protective layer of Mylar over the first layer.

21. A touchpad pointing device comprising,
 

- a two-layer printed circuit board as a substrate,
- a first layer, located on the top side of the printed circuit board, which combines both horizontal and vertical sensor traces on the same surface of the first layer,
- and a second layer, located on the underside of the printed circuit board, which is formed by touchpad electronic circuitry.

22. A touchpad as in claim 21 wherein the horizontal traces are metal and the vertical traces are conductive ink.